

### **REMARKS**

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-9, and 12-15 are presently active in this case. Claims 10-11 have been cancelled by a previous amendment. The present Amendment amends Claims 1, 9, and 12-15 without introducing any new matter; and cancels Claim 3 without prejudice or disclaimer.

The outstanding Office Action rejected Claims 1-9 and 12-14 were rejected under 35 U.S.C. § 103(a) as unpatentable over Lee et al. (IEEE Publication, "Recognition of Negative Emotions from the Speech Signal," University of Southern California, Los Angeles, CA, U.S.A., 2002, hereinafter "Lee") in view of Brandstein et al. (JASA publication, "Microphone-Array Localization Error Estimation with Application to Sensor Placement," Brown University, Providence, Rhode Island, U.S.A., 1995, hereinafter "Brandstein".) Claim 3 was rejected under 35 U.S.C. § 103(a) as unpatentable over Lee in view of Brandstein, in further view of Gable et al. (U.S. Patent Publication No. 2005/0060153, hereinafter "Gable".)

First, Applicants wish to thank Examiners Godbold and Smits for the courtesy of an interview granted to Applicants' representative Nikolaus Schibli on June 24, 2008, at which time the outstanding issues in this case were discussed. In particular, the features related to the use of the absolute loudness at a location of the source of the speech, that is used to identify the speaker, were discussed. Arguments similar to the ones developed hereinafter were presented and the Examiners indicated that they would reconsider the outstanding grounds for rejection upon formal submission of a response.

As discussed during the interview, independent Claim 1 is now amended to recite "evaluating at least one of said speech input and said speech parameters using said parameters describing the absolute loudness to identify the speaker." This feature is supported by dependent Claim 3, and by Applicants' disclosure in a non-limiting

embodiment, for example at p. 3, ll. 7-12. No new matter has been added. Consequently, dependent Claim 3 is cancelled. The remaining independent Claims 9, and 12-15 have been amended to recite an analogous feature, in the respective claim language and directed to the different statutory classes.

In response to the rejections of Claims 1-9 and 12-14 under 35 U.S.C. § 103(a), in light of the amendments to the independent claims and the following discussion, Applicants respectfully request reconsideration of these rejections, and traverse the rejections.

Briefly recapitulating, Applicants' Claim 1 relates to a method for processing speech. The method includes the steps receiving a speech input of a speaker, generating speech parameters from said speech input, determining parameters describing an absolute loudness of said speech input, the absolute loudness being a loudness of the speech at a location of a source of the speech, and *evaluating at least one of said speech input and said speech parameters using said parameters describing the absolute loudness to identify the speaker.*

As explained in Applicants' specification in a non-limiting embodiment, the use of absolute loudness as a parameter for speaker identification is a key feature of the invention, and the rate of successful speaker identification improves significantly by using absolute loudness as an additional input parameter for the recognition system. (Specification, p. 3, ll. 7-12.) Moreover, the absolute loudness could not be used as a parameter to process speech for one of emotion recognition or speaker identification in the background art, since only one speaker has been used. (Specification, p. 5, ll. 25-29.)

Turning now to the applied references, Lee is directed to a method to automatically classify spoken utterances based on the emotional state of the speaker. (Lee, Abstract.) Acoustic features are calculated of the spoken utterances, such as the pitch and energy from the speech signal. (Lee, p. 241, col. 1, ll. 44-45.) The speech signals in Lee originate from a spoken dialogue over the phone with a machine agent of a call center application. (Lee, p.

241, col. 1, ll. 4-8.) The calculated acoustic features include many parameters defining the pitch and the energy level, such as mean value, median value, minimum, maximum, and range. (Lee, p. 241, col. 1, ll. 53-58.) All of Lee's samples are also ***normalized***, that means that the origin was shifted and scaled to 1. (Lee, p. 241, col. 2, ll. 1-5.)

From the above discussion it is evident that the cited passages of Lee fail to teach a step of evaluating at least one of said speech input and said speech parameters using said parameters ***describing the absolute loudness*** to identify the speaker, as required by Applicants' Claim 1. First, Lee uses a single microphone for recording, for example a telephone, and second, Lee applies a normalization filter to all the samples where any information on loudness at a source will get lost. In addition, Lee clearly cites that the energy level of the speech signal ***as received at the microphone*** is calculated. Therefore, Lee fails to teach the evaluating step as required by Applicants' amended Claim 1.

The reference Brandstein is directed to a method capable of predicting an error region associated with a speech source location that is obtained by a set of microphones. (Brandstein, Abstract.) Brandstein explains that his teachings can locate a source of speech by using a time-difference-of arrival analysis (TDOA) on several microphone channels. (Brandstein, p. 3, starting at l. 19.) His main goal is to detect and track a moving audio source inside a reception area, for example to attenuate other speakers in the same area. (Brandstein, p. 1, ll. 11-12, ll. 19-21.) Brandstein shows in his specification a model that can be used to calculate speech source location, called the "source model." (Brandstein, p. 21, ll. 10-14.) But Brandstein is silent to a step of evaluating at least one of said speech input and said speech parameters using said parameters ***describing the absolute loudness*** to identify the speaker, as required by Applicants' Claim 1.

The reference Gable, used by the pending Office Action to support a 35 U.S.C. § 103(a) rejection of dependent Claim 3, these features now being incorporated into

independent Claim 1, is directed to a system for speech characterization, where a speaker can be verified by collecting data from a speaker and also by collecting non-acoustic data from a GEMS sensor 208. (Gable, Abstract, Fig. 2.) Gable explains that parameters are extracted from acoustic data and non-acoustic EM data form a set of feature vectors used to calculate a performance. (Gable, ¶¶ [0026]-[0028].) Gable mentions that verification parameters represent the individuality of a speaker, containing information about the timing, pitch, and amplitude of the speech. (Gable, ¶ [0027], ll. 5-8.) Gable may thereby identify a speaker by using non-acoustic data, but fails to teach a step of evaluating at least one of said speech input and said speech parameters using said parameters *describing the absolute loudness* to identify the speaker, as required by Applicants' Claim 1.

Therefore, even if the combination of Lee, Brandstein, and/or Garble is assumed to be proper, the cited passages of the combination fails to teach every element of Applicants' amended Claim 1. Specifically, the cited passages of the combination fail to teach the use of the loudness of the speech at a location of a source of the speech, to determine the identity of the speaker. Accordingly, Applicants respectfully traverse, and request reconsideration of, this rejection based on Lee, Brandstein, and/or Garble.

Applicants also respectfully traverse the obviousness of the features of independent Claim 1 in light of the references Lee, Brandstein, and/or Garble. The pending Office Action explains that "one of ordinary skill in the art could recognize from this relationship could be used to normalize the detected loudness, instead of normalizing to 1, and that this would be merely a matter of design choice." (Office Action, p. 3, ll. 8-10.) Applicants respectfully disagree with such extension of the teachings of Lee, Brandstein, and/or Garble. As a fact, none of the references teaches such a feature, no matter how we combine them.

Furthermore, it is not clear from the record or from the outstanding Office Action's reasoning how Brandstein's multi-speaker system to identify a location of a targeted speech

source could be incorporated into Lee's system for analyzing callers that speak to an automatic call center by a telephone. Under such a modification, Lee's system could not be used as suggested in his own teachings and motivations, since the telephone and the commercial application software of SpeechWorks™ could not be used, thereby defying the gist of Lee's invention. (Lee, Abstract, col. 1, ll. 20-28.) Such modification would clearly require a substantial reconstruction or redesign of the elements of Lee, and/or would change the basic principle of operation of Lee. For example, a telephone microphone could not be used. There is no evidence that a person of ordinary skill in the art would be motivated to perform such changes and redesign,<sup>1</sup> nor has the U.S.P.T.O. provided an articulated reasoning for the obviousness.

Independent Claims 9, and 12-15 recite features that are analogous to the features recited in independent Claim 1, albeit directed to different statutory classes. Moreover, Claims 9, and 12-14 have been amended in a manner analogous to the amendment to Claim 1. Accordingly, for the reasons stated above for the patentability of Claim 1, Applicants respectfully submit that the rejections of Claims 9, and 12-15, and all associated dependent claims, are also believed to be overcome in view of the arguments regarding independent Claim 1.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-9 and 12-15 is earnestly solicited.


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<sup>1</sup> See In re Ratti, 270 F.2d 810, 813, 123 USPQ 349, 352 (reversing an obviousness rejection where the "suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which the [primary reference] construction was designed to operate.")

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the below listed telephone number.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



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Bradley D. Lytle  
Attorney of Record  
Registration No. 40,073

Customer Number

**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 08/07)

Nikolaus P. Schibli, Ph.D.  
Registered Patent Agent  
Registration No. 56,994